ICON

2U 4-Slot Industrial PC Chassis

User Manual

ICON

User Manual

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COMPANY PROFILE

Blue Chip Technology Ltd is the leading specialist PC product manufacturer in UK/Europe.

Blue Chip Technology Ltd provides innovation with quality design and manufacturing from a single source.

Based in the North West of England, our purpose built complex contains one of the most advanced research and development facility, engineering workshop and production lines.

Specialising in the provision of industrial computing and electronic solutions for a wide range of UK and European organisations, Blue Chip Technology Ltd has one of the UK's largest portfolios of industrial PCs, peripherals and data acquisition cards. This extensive range of products, coupled with our experience and expertise, enables Blue Chip Technology Ltd to offer an industrial processing solution for any application. The WILDCAT Single Board PC is the latest addition to our portfolio, providing a cost effective product development and volume production tool for OEMs.

A unique customisation and specialised system integration service is also available, delivering innovative solutions to customers problems. The company's success and reputation in this area has led to a number of large design and manufacturing projects for companies such as BNFL and British Gas.

British Standards Institute approval (BS EN ISO9001) means that all of Blue Chip Technology Ltd’s design and manufacturing procedures are strictly controlled, ensuring the highest levels of quality, reliability and performance.

Blue Chip Technology are also committed to the single European market and continue to invest in the latest technology and skills to provide high performance computer and electronic solutions for a world-wide customer base.

Blue Chip Technology Limited
Chowley Oak
Tattenhall
Chester
Cheshire
CH3 9EX
United Kingdom

Telephone : +44 (0)1829 772000
Facsimile : +44 (0)1829 772001
URL : www.bluechiptechnology.co.uk

INTRODUCTION

MANUAL OBJECTIVES

This manual describes in detail the Blue Chip Technology 2U Industrialised PC chassis.

We strongly recommend that you study this manual carefully before attempting to change the system configuration as supplied. Whilst all the necessary information is available in this manual we would recommend that unless you are confident, you contact your supplier for guidance.

If you have any suggestions or find any errors concerning this manual and want to inform us of these, please contact our Customer Support department with the relevant details.

LIMITATIONS OF LIABILITY

In no event shall Blue Chip Technology be held liable for any loss, expenses or damages of any kind whatsoever, whether direct, indirect, incidental or consequential, arising from the design or use of this product or the support materials supplied with this product. If this product proves to be defective, Blue Chip Technology is only obliged to replace or refund the purchase price at Blue Chip Technology's discretion according to their Terms and Conditions of Sale.

PRECAUTIONS

It is imperative that precautions are taken to avoid damage to the contents of the chassis and any electronic circuit boards that may be fitted.

ELECTRO-STATIC DISCHARGES

The devices in the chassis and on circuit boards can be totally destroyed by static electricity. Ensure that you take necessary static precautions before working on the system, ideally wear an approved wrist strap or touch a suitable ground to discharge any static build up. This should be repeated if the handling is for any length of time.

If carrying a circuit board around, please place it into an anti-static bag. This will prevent any static electricity build up. Do not use the black conductive type of anti-static bag, as these will discharge any on-board battery that may be incorporated.

BATTERIES ON CIRCUIT BOARDS

Some boards are fitted with batteries (typically Lithium cells). Great care should be taken with this type of cell, because mistreatment can create a real hazard. Under NO circumstances should the battery:

- outputs be shorted
- be exposed to temperatures in excess of 100°C
- be burnt
- be immersed in water
- be unsoldered
- be recharged
- be disassembled

If a battery is mistreated in any way there is a very real possibility of fire, explosion, and personal harm.

RELATED PUBLICATIONS

The following publications will provide useful information related to the Standard Personal Computer and can be used in conjunction with this manual.

- IBM Personal Computer AT Technical Reference, 1502494, IBM, 1984.
- IBM Personal System/2 and Personal Computer BIOS Interface Technical Reference, 15F0306, IBM, 1987.
- The Programmers PC Sourcebook, Microsoft
- The Winn L. Rosch Hardware Bible, Brady
- PCI Specification 2.1

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OVERVIEW

The ICON is a ruggedised PC compatible microcomputer designed for reliable operation in adverse environments. It is available both as a 19" rack mountable unit, and as a desktop unit. Both units use a common chassis and layout. System controls and disk drives are protected behind a lockable steel door. The machine is cooled internally by filtered air that enters through a removable filter at the front panel and exits at the rear. Access to the internal items is by a removable cover. Connections to the boards are made at the rear of the chassis and behind the front door.

FEATURES

- Robust steel chassis using recognised electromagnetic compatible (EMC) emission and immunity design techniques.
- Front panel with lockable door security for system controls.
- PICMG, PISA, PCI & ISA compliant (dependent upon the backplane fitted).
- AC & DC switch mode PSU options.
- Anti-vibration drive cage mountings
- Two accessible drive bays: 1 x 5¼", and 1 x 3½" drive bay
- One internal 1 x 3½" drive bay
- Filtered air through two 60 x 25 mm, 12V DC fans mounted behind the filter panel.
- Easy access to the quick change air filter.
- Coated polyester filter; 30 PPI porosity and flammability rating to UL94 Class V0.
- Modular construction allows fan removal/replacement.
- Optional telescopic slide rail fittings.
- Each system is supplied configured to order. The System Release Documentation details each particular system's configuration.

DESCRIPTION

CHASSIS

The basic chassis is common to both the rack mounting and desktop assemblies. They comprise the following sub-assemblies:

Chassis
Cooling fan/filter assembly
Chassis front panel
Chassis cover
Internal drive cage assembly
Removable card assembly
Power supply unit

The common metalwork is of steel construction with riveted fitments. Removable items are fixed by screws.

RACK MOUNT VERSION

The Rack Mount unit is shown in Figure 1. It differs from the Desktop chassis in that it includes a polished stainless steel cover and mounting ears.

The front panel is a 2U high, full 19" racking width panel. The front panel secures the unit to the rack ladder by four fixing screws. To facilitate withdrawal from the racking, handles are fitted to the front panel.

The rack mount unit has tapped holes along each side to facilitate the mounting of the slide rails. Take care not to insert longer screws than those provided in the side (M4 x 6 maximum). Overly long screws may cause internal damage.

Note that the chassis must not be mounted by the front mounting ears alone. Either slide rails or brackets must be used to support the weight of the system.

DESKTOP VERSION

The Desktop unit is shown in Figure 2. It differs from the Rack Mount unit only in that it incorporates a painted cover, and is without the mounting ears.

Figure 1 Rack Mount Dimensions

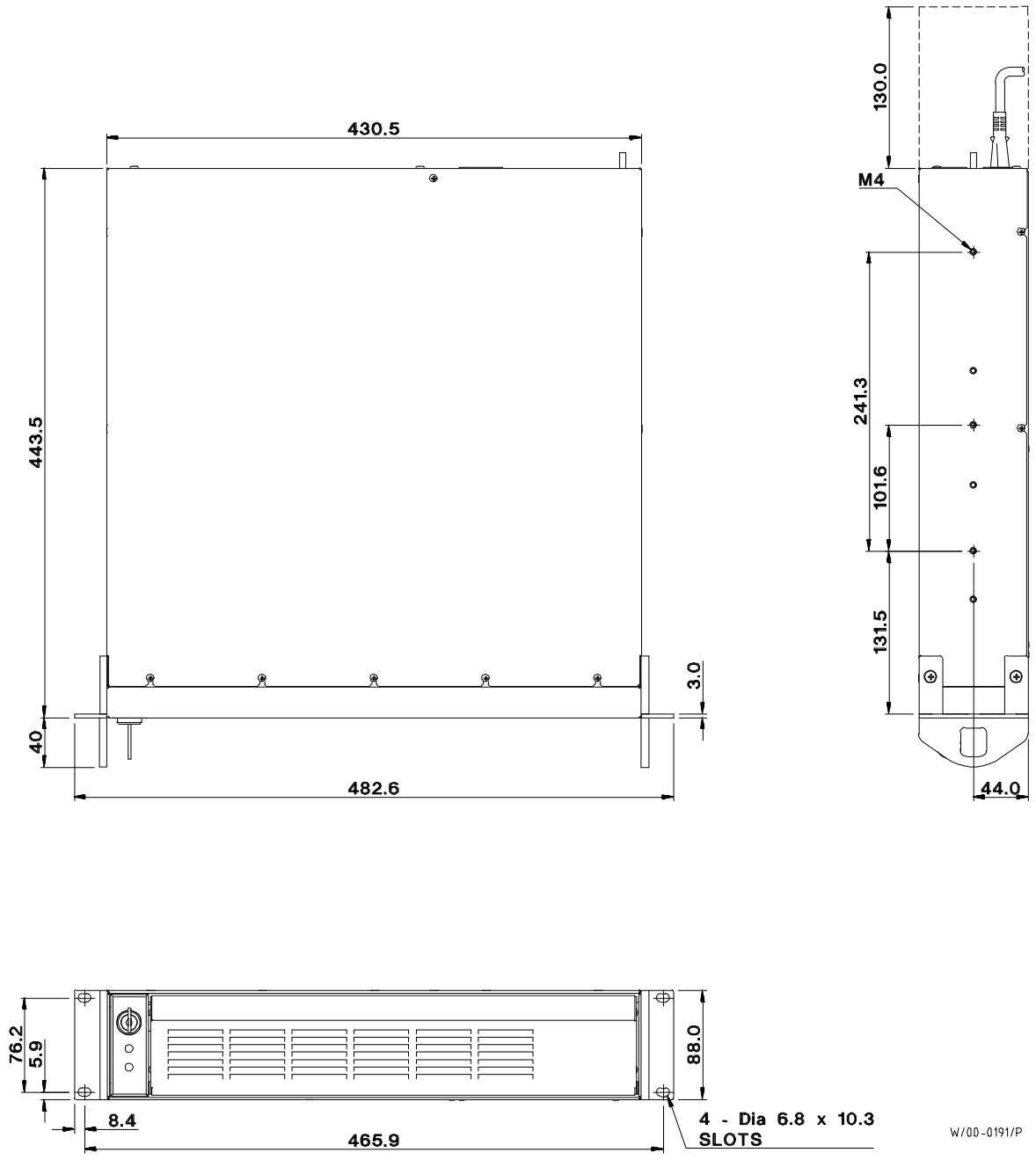
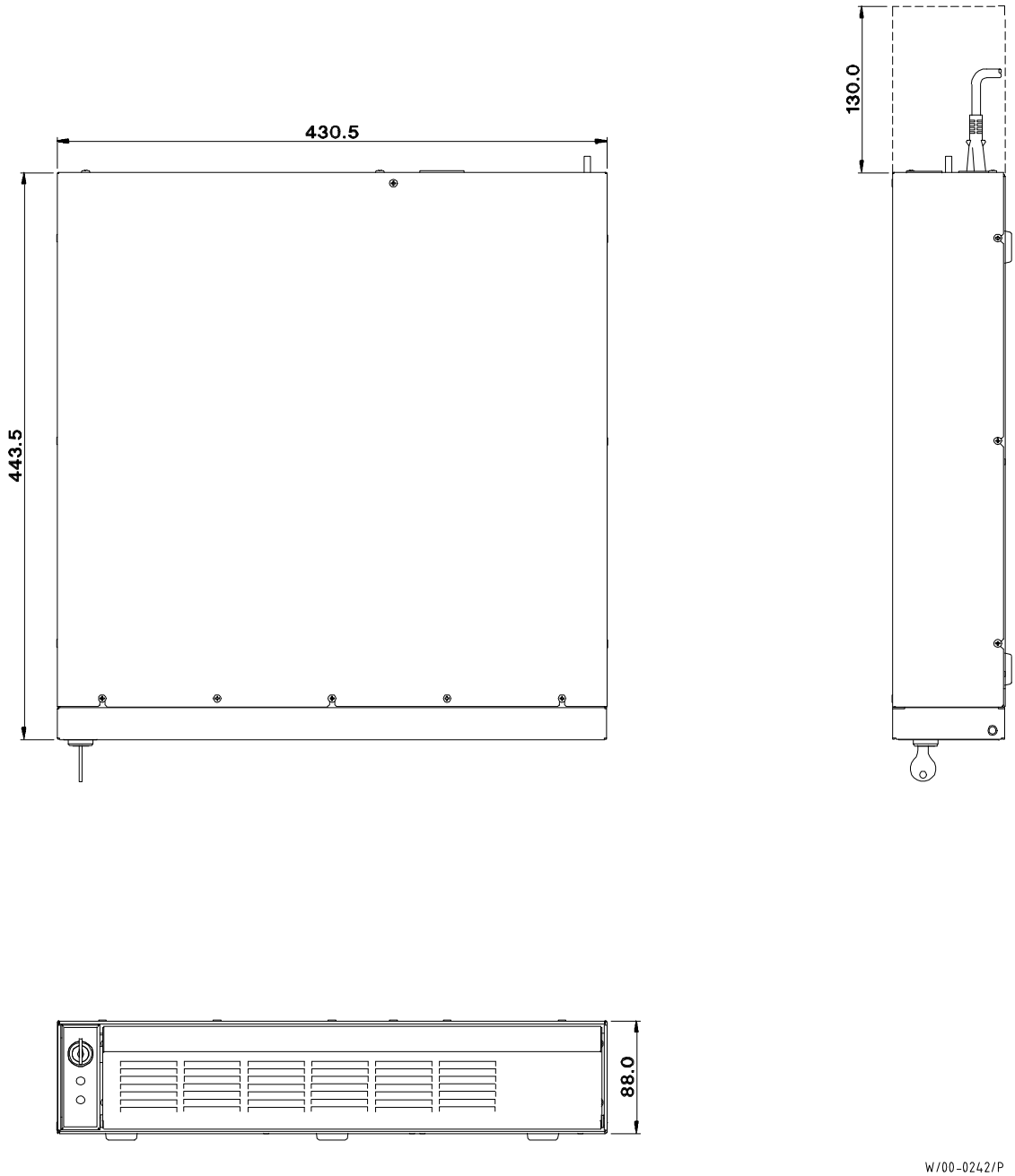


Figure 2 Desktop Dimensions



FRONT PANEL

The front panel incorporates a lockable hinged door. The door is louvered to allow air through to the air filter and cooling fans. The door also gives access to the drive bays, the power and reset switches and keyboard connector.

The door is held closed by a "push-push" door catch and secured by a key-lock. Once the key lock has been turned, push and release the centre of the door near the top and the door will hinge down. The bottom travel of the door is spring damped.

REAR PANEL

All electrical connections to the ICON are made at the rear of the unit. Units are configured individually to requirements. Refer to the System Release Documentation for details of a particular PC configuration.

To ensure the integrity of the system EMC, it is important that the chassis earth stud is connected direct to the best available cabinet earth in rack mounted installations, because of the proximity of other electrical equipment.

POWER SUPPLY

The chassis may be fitted with a variety of PS/2 style power supply units (PSUs). Note that PSUs intended for ATX applications are fitted with power standby switches only. They do not have isolating switches in the power line. With these the PSU remains powered on for as long as the AC input supply is connected. It is important that the supply be completely disconnected before attempting to modify the internal configuration of the chassis (e.g. add or remove boards).

Some PSUs may have a switch-selectable input voltage range. In these cases the following warning should be observed.

WARNING

Selection of the wrong voltage may cause permanent damage to the unit. Ensure that the switch is correctly set for the installation supply before connecting to the supply. If the wrong voltage is applied to the unit the internal fuse may protect the ICON. However, this cannot be guaranteed. Blue Chip Technology cannot accept any responsibility for the consequences of operating the unit on the wrong supply.

TECHNICAL SPECIFICATION

Chassis	2U 19" Rack mountable	
	Removable service access cover	
	Removable card assembly	
	Shock mounting for drives	
	Rear access to expansion cards	
	Rack mounting brackets (optional)	
	Optional fully extending slide rails (optional)	
	High capacity fans 2 x 60mm cooling fans	
	Air filter 30 PPI approved to UL94 V-0	
	Locking door covering disk drives, power and reset switch.	
	Front panel customisation options	
Temperature	Operating	0 to 40°C
	Storage	-4 to 60°C
Humidity	Operating	5-80% RH non-condensing
	Storage	5 to 90% RH non-condensing
Altitude	Operating	up to 3,000m
Safety	EN 60950	
EMC	Emissions	EN55022(A)
	Immunity	EN50082-1 and EN55024
Power	Standard AC	
	Voltage	90-135/180-265 VAC, switched
	Frequency	47-63Hz
	Total output power	200W
	Optional DC	
	Voltage	
	+24V	
	Total output power	250W

EMC

This product as supplied meets the requirements of the European Union Directive 89/336 EC and Amendments, and is eligible to bear the CE mark.

It meets the requirements for an industrial environment. However, it must be noted that because the unit is user configurable, certain precautions will be required to maintain that compatibility.

- The body of the unit must be earthed using the earth stud on the rear, adjacent to the power supply. The earth lead should be as short as possible and connect to the incoming cabinet earth.
- If a rack-mounted monitor is used, it is recommended that the monitor earth stud be connected using as short a lead as possible to the PC earth stud.
- It is essential that the housing lid is firmly secured using all the fixing screws.
- The blanking panels covering the unused expansion slots must be securely screwed to the back panel to ensure an adequate earth connection.

- Any expansion boards must be correctly fitted and the metal bracket secured to the back panel using the screw to ensure an adequate earth connection.

- It is imperative that any cables connecting to the expansion boards are fully screened and connect to the metal bracket and hence are earthed. It is recommended that woven braid screened cables are used in preference to the foil screen and drain wire type. Metal connector shells that connect around the braid are preferable to types that are earthed by a single “pig-tail” wire.

Failure to comply with these recommendations may invalidate the compliance with the EMC Directive.

WARNING

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

INSTALLATION

ELECTRICAL

This item must be connected to an earthed socket. A stud is fitted to the rear panel of the chassis. It is recommended that this is also connected to a good earth within the racking system. Cutting washers must be used in order to maintain a good connection.

The plug on the power supply cord is intended to serve as the power disconnect device. The socket outlet into which this is plugged should be near the equipment, and should remain readily accessible when all items are mounted in the racking enclosure. It is good practice to identify the socket.

If the plug fitted to the power supply cord is removed, the cord should be connected to a suitably installed power disconnect device, by qualified personnel.

RACK MOUNTING

If the ICON is to be installed in a 19" rack unit, it is recommended that telescopic slide rails be used. A slide rail kit is available from Blue Chip Technology Ltd.

WARNING

Under no circumstances must the ICON be mounted in a 19” rack solely by its front panel fixings. Slide rails or a rear support must be used.

Before installation carefully assess the space available. Figure 1 gives outline dimensions of the chassis. Ensure there is enough room at the rear of the unit for cables. DO NOT mount the unit in such a way that air inlet or outlet vents are covered or blocked.

The slide rail kit will accommodate cabinets with front to rear ladder depths from 470mm to 740mm. The slide rail kit comprises:

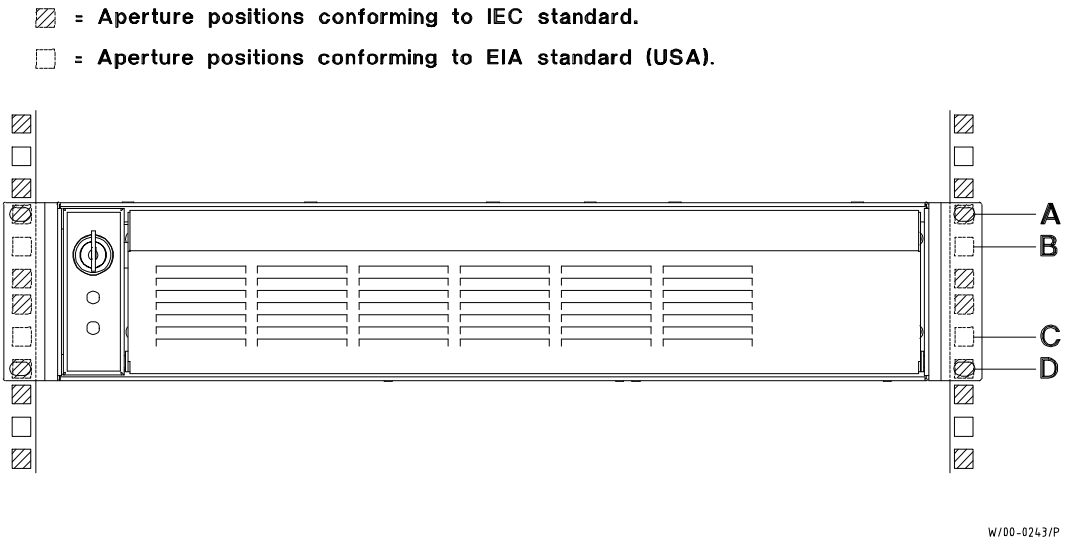
M6 cage nut	12
M6 x 16 pan-head screw	4
M6 brass screw	8
M6 cup washer	4
Bar nut	4
Large extension bracket	2
Small extension bracket	2
Telescopic slide rail	2
M4 screws, nuts & washers	8

SLIDE RAILS

Telescopic slide rail installation is shown in Figures 3, 4 and 5.

Refer to Figure 3 to identify the pattern of the ladder holes. Holes A and D hold cage nuts to which the front panel will eventually be secured. Holes B and C hold cage nuts and clamp the front end of the fixed section of the slide rails to the racking ladder using a bar nut.

Figure 3 19" Racking Ladder Holes



Referring to Figure 4, clip cage nuts (A) into front and rear ladder sections in the positions indicated. Then insert the brass screws (B) fully through the cage nuts indicated.

Slide out the chassis side rail, disengage by pressing the spring catch and pull out from the ball bearing assembly. Attach front (C) and rear (D) slide rail extension brackets to outer slide rail (E) using M4 screws, nuts and washers (F) provided with each slide rail bracket, 2 per bracket as required.

Adjust the slide rail brackets so that the bracket outer face touches the cage nut back face. Mount the slide rail assembly in to the rack, on the brass screws, protruding from the back of the cage nuts, at both front and rear ladder sections.

Slide the bar nuts (G) in to position and fasten on to the brass screws. Tighten brass screws at both front and rear ladder sections.

The ICON chassis is supplied with the slide rail fixing screws already assembled to the cover. Remove all the screws, but do not discard.

WARNING

Do not use any other screws than the ones provided (M4 x 6 maximum). The use of longer screws may damage the electronics within the unit.

Referring to Figure 5, attach the inner rails (A) to ICON sides using M4 x 6 screws (B), removed earlier. Note not all threaded holes are used for BCT standard slide rails.

Slide unit on to rack rails until the spring catches lock in to position. Press the catches and slide unit home.

The ICON will need to be adjusted in order for the front panel to fit correctly in the rack. Slacken the front brass screws and adjust unit until front panel is central and does not foul equipment panels above and below. This is best achieved by adjusting each side and tightening front brass screws separately.

When the unit is satisfactorily adjusted, secure the ICON to the rack ladders using M6 screws and plastic cup washers.

Figure 4 Rack / Slide Rail Assembly

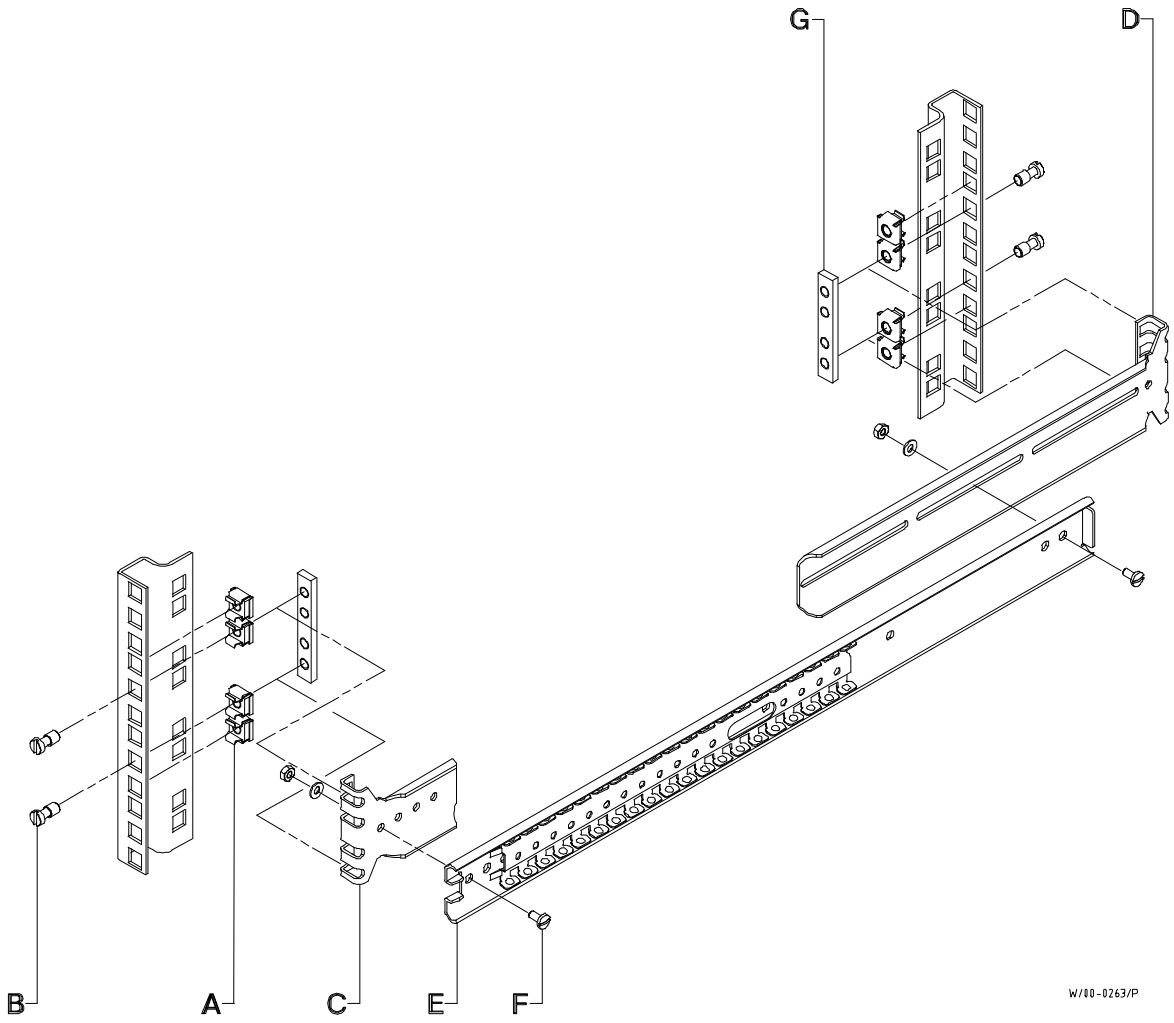
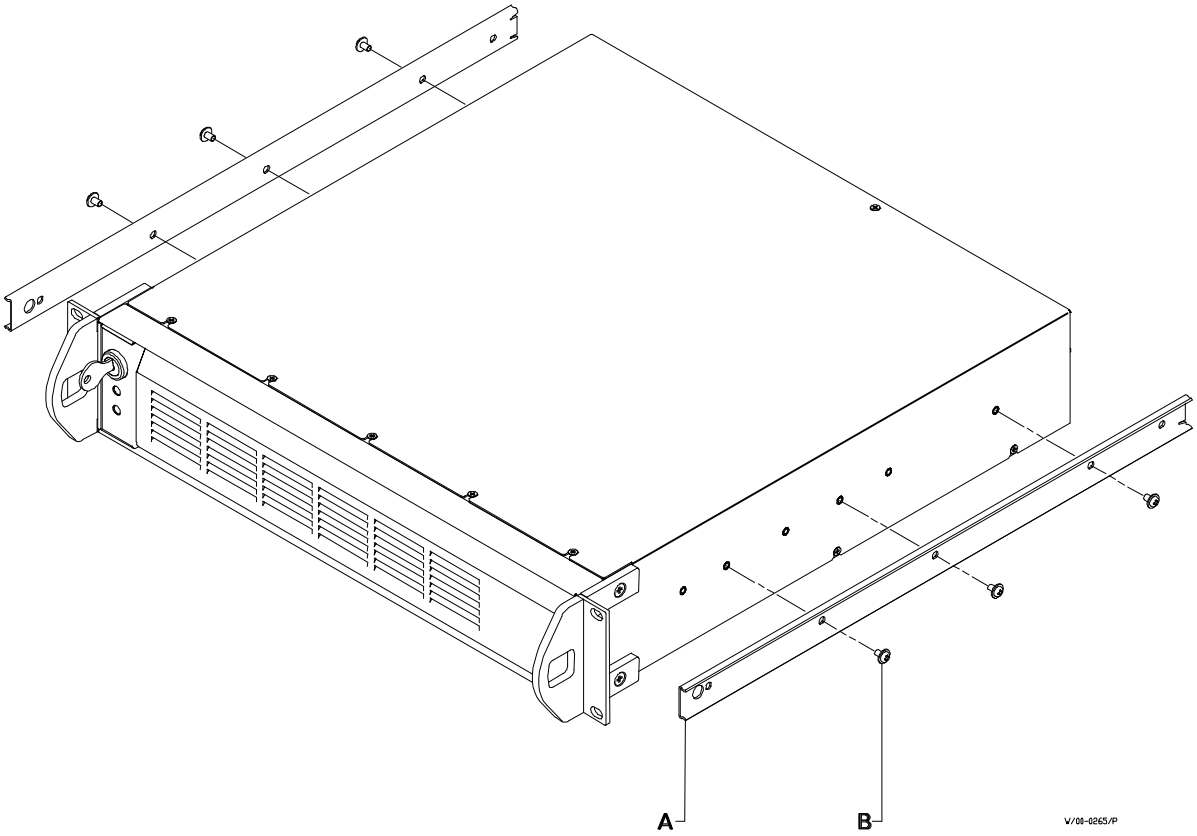


Figure 5 ICON / Slide Rail Assembly



MAINTAINING & EXTENDING THE SYSTEM

PRECAUTIONS

WARNING

Before removing any cover ensure that the unit is both switched off and that the mains cable has been disconnected. Note that dangerous voltages exist within the unit.

WARNING

The electronic assemblies within the unit are susceptible to damage from electrostatic discharges (ESD). Take anti-static precautions before handling, otherwise damage will occur.

TOOLS

The following readily available standard tools are required to maintain and upgrade the ICON:

- Pozi screwdriver #1
- Pozi screwdriver #2
- Philips screwdriver #2
- Nut runner M3

REPLACING THE AIR FILTER

Depending upon environmental conditions, the air filter will need to be cleaned from time to time. Routinely examine the filter for dust build up. The air filter is accessible from the front of the chassis. It may be cleaned or replaced.

To remove the filter open the system door as described in section titled "Front Panel". Remove the filter by pinching the middle of the filter between forefinger and thumb. Wash the filter in warm water to which has been added a low foam domestic detergent, rinse and drip dry.

Replace filter into the recess in the front panel and close door.

REMOVING THE SYSTEM COVER

To maintain the ICON's EMC integrity, the cover is fastened to the chassis by eight M3 countersunk screws and four M5 countersunk screws (via rack mount ears). It is not necessary to remove all of these cover screws to remove the Top Cover.

Remove the single M3 screw located on the cover top face at the rear of the unit. Slacken the remaining seven M3 screws and the four M5 screws. Lift the cover up at the rear and slide it back, away from the front screws.

Replacing the unit cover is the reverse of the above.

INSTALLATION & REMOVAL OF CARDS

REMOVABLE CARD ASSEMBLY

All cards are installed in a removable card frame assembly. The cards may be fitted to both sides of the assembly (the CPU side or the PSU side). The technique varies dependent upon the side. To add or remove cards on the CPU side, it is not necessary to remove the card assembly, whereas to add or remove cards on the PSU side, it is necessary to remove the card assembly, as follows:

- Disconnect the two fan connectors and power switch connector on the CPU side and front panel end of the backplane.
- Disconnect the Floppy drive and IDE ribbon cables, and the utilities cable from the Single Board Computer on the CPU side of the card assembly.
- Remove the four screws on the chassis rear panel holding the card assembly.
- Slide the card assembly forward towards the front of the chassis until the tabs disengage from the chassis base. One tab can be seen through the card assembly near to the fans mounted on the chassis front panel by the Hard Disk Drive.
- Angle the card assembly up and disconnect the ATX power connector from the PSU side of the card assembly.
- The card assembly can now be removed from the chassis.

Replacement is a reversal of the removal process.

ADDING AN EXPANSION CARD

Observe the warnings in the section "Precautions".

- Remove the system cover as described in the section "Removing the System Cover".
- Determine on which side of the card assembly the expansion card is to be fitted and follow the instructions in the section "Removable Card Assembly".
- Check the expansion card documentation to ensure it is correctly configured, paying particular attention to the selection of any link settings.
- Identify the backplane connector slot to be used. Remove the M3 screw from corresponding blanking plate on the card assembly back panel. Retain the screw for use later.
- If a full-length board is to be installed, locate the board end into the plastic guide corresponding to the chosen slot. Slide the board into the guide until the board's gold edge connector contacts the back plane connector. Press the board firmly into place.
- Fasten the metal bracket into place using the M3 screw removed earlier.

REMOVING AN EXPANSION CARD

Observe the warnings in the section "Precautions".

- Remove the system cover as described in the section "Removing the System Cover".
- Determine which side of the card assembly the expansion card is to be removed and follow the instructions in the section "Removable Card Assembly".
- Remove the M3 screw securing the cards end bracket. Carefully remove the board from the connector by gently pulling the board at each end in a rocking motion (in a plane along its length front to back, not side to side). Slide the board out of the card assembly.
- Replace the blanking panel and screw.

REPLACING THE PSU

To remove the power supply unit, first ensure that the power supply is switched off at the front panel. Disconnect the AC supply to the unit.

- Remove the system cover as described in the section "Removing the System Cover".
- Disconnect the DC output leads from the drives and the passive back plane.
- Inside the chassis remove the two M3 nuts holding the PSU to the base. At the rear of the chassis, remove the four screws holding the PSU to the rear panel and lift out the PSU.

Replacement is a reversal of the removal process.

DATA STORAGE DEVICES

The ICON system provides two data storage device assemblies: an external drive bay (supporting 1 x 5¼" and 1 x 3½" drive), and an internal drive bay (supporting 1 x 3½" drive with an optional second 1 x 3½" drive).

Each drive bay is a two bracket assembly, retained in the chassis by a single M4 screw (one per assembly).

REMOVING THE EXTERNAL DRIVE BAY

Observe the warnings in the section "Precautions".

- Remove the system cover as described in the section "Removing the System Cover".
- Disconnect the Floppy Drive and IDE ribbon cables from the drives.
- Disconnect 5¼" power connector.
- Remove the M4 screw securing this drive bay.
- Slide the assembly towards the rear of the chassis until it stops. Carefully raise the back of the drive bay until access can be gained to the 3½" power connector and disconnect.
- Remove the assembly.

Replacement is the reversal of the above procedure, taking care to

- Locate the drive bay hooks into the plate slots on both sides, before pushing the drive bay assembly toward the front panel to lock it into place.
- Locate the drive bay assembly flat on the plate.
- Ensure that cables are not trapped.

If another data storage device is to be installed refer to the manufacturers installation instructions to ascertain the correct fasteners.

REMOVING THE INTERNAL DRIVE BAY

Observe the warnings in the section "Precautions".

Remove the system cover as described in the section "Removing the System Cover".

If a full-length card is fitted to the PSU side of the card assembly, it will be necessary to remove the card-frame assembly to gain access to the internal drive bay. Follow the instructions in the section "Removable Card Assembly".

- Disconnect the Hard drive cable from the drive.
- Disconnect Hard drive power connector.
- Remove the M4 screw securing this drive bay.
- Slide the assembly to the rear of the chassis until it stops.

- Remove the assembly

Replacement is the reversal of the above procedure, taking care to

- Locate the drive bay hooks into the plate slots on both sides, before pushing the drive bay assembly toward the front panel to lock it into place.
- Locate the drive bay assembly flat on the plate.
- Ensure that cables are not trapped.

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